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Amendments to the Specification:

Please replace the paragraph beginning at page 1, line 19, with the following rewritten paragraph:

Multi-layer piezoelectric actuators 53 constituted from piezoelectric layers and electrodes stacked alternately one on another have been known as an example of the multi-layer piezoelectric element. The multi-layer piezoelectric actuators 53 can be divided into two categories: fired-at-once type and stacked type where piezoelectric porcelain and internal electrode sheet are stacked one on another alternately. When the requirements to reduce the voltage and manufacturing cost are taken into consideration, the multi-layer piezoelectric actuator 53 of fired-at-once type is more advantageous for the reason of smaller layer thickness and higher durability.

Please replace the paragraph beginning at page 2, line 21, with the following rewritten paragraph:

Fig. 8A shows a multi-layer piezoelectric element of the prior art, which is constituted from piezoelectric layers [[1]] 11 and internal electrodes [[2]] 12 stacked alternately one on another. As shown in Fig. 8A and Fig. 8B, the internal electrode 12 is not formed over the entire principal surface of the piezoelectric layer 11, but is formed in a so-called partial electrode structure. The internal electrodes 12 having the partial electrode structure are stacked in a staggered manner, so that the internal electrodes [[2]] 12 are connected to external electrodes [[4]] 15, that are formed on the side faces of the multi-layer electronic component, alternately in every other layer. Fundamental structure of the multi-layer piezoelectric element is

the same as that of the multi-layer capacitor shown in Fig. 9, and is manufactured by printing a paste for the internal electrode in a predetermined pattern on a ceramic green sheet, stacking a plurality of the green sheets having the paste for the internal electrode printed thereon, and firing the stack (refer, for example, to Patent Document 2).

Please replace the paragraph beginning at page 3, line 16, with the following rewritten paragraph:

The multi-layer piezoelectric element comprises a column-shaped stack 13 formed by stacking the piezoelectric layers 11 and the internal electrodes 12 alternately. Placed on both ends in the direction of stacking are inactive layers 14. The internal electrodes 12 are formed so as to be electrically connected to the external electrode [[14]] 15 at the end on the right hand side in one layer and at the left hand side in the next layer. When the multi-layer piezoelectric element is used as the multi-layer piezoelectric actuator, the external electrodes [[14]] 15 are further provided with lead wires fastened thereto by soldering.

Please replace the paragraph beginning at page 5, line 16, with the following rewritten paragraph:

In the prior art, there has been such a problem that the ~~mount~~ amount of displacement of a piezoelectric actuator varies as the device temperature rises, because of the temperature dependency of the piezoelectric material that means the amount of displacement changes with the ambient temperature. A change in the amount of displacement during operation of the actuator, in turn, causes fluctuation

in the load on the power source that supplies the voltage, thus placing a burden on the power source. When the amount of displacement undergoes a rapid change, the amount of displacement deteriorates rapidly. When the heat generated by the device exceeds the heat that can be removed by dissipation, thermal excursion occurs, resulting in breakage and failure.

Please replace the paragraph beginning at page 10, line 25, with the following rewritten paragraph:

In the multi-layer piezoelectric element of the present invention, it is preferable that specific resistance of the ~~internal electrode~~ device is higher than the resistance ρAg of the device having the internal electrode of which metallic component consists solely of silver, and is lower than the resistance ρPd of the device having the internal electrode of which metallic component consists solely of palladium.

Please replace the paragraph beginning at page 11, line 7, with the following rewritten paragraph:

In such a multi-layer piezoelectric element as described above, an electrode that is excellent in heat resistance and has low specific resistance of the ~~internal electrode~~ device can be made, thus making it possible to suppress the heat generation from the internal electrode even when operated continuously. Moreover, since the amount of displacement of the piezoelectric actuator can be stabilized by suppressing the device temperature from increasing, the piezoelectric actuator having excellent durability and high reliability can be provided.

Please replace the paragraph beginning at page 11, line 18, with the following rewritten paragraph:

The multi-layer piezoelectric element of the present invention comprises a stack formed by stacking piezoelectric layers and internal electrodes alternately one on another and external electrodes formed on a first side face and on a second side face of the stack, wherein one of the adjacent internal electrodes is connected to the external electrode formed on the first side face and the other internal electrode is connected to the external electrode formed on the second side face, while the electric resistance of the ~~internal electrode~~ device is higher than the resistance ρAg of the device having the internal electrode of which metallic component consists solely of silver, and is lower than the resistance ρPd of the device having the internal electrode of which metallic component consists solely of palladium.

Please replace the paragraph beginning at page 12, line 7, with the following rewritten paragraph:

With such a multi-layer piezoelectric element having the constitution described above, an electrode that is excellent in heat resistance can be made and the specific resistance of the ~~internal electrode~~ device can be made lower, thus making it possible to suppress the heat generation from the internal electrode even when operated continuously. Moreover, since the amount of displacement of the piezoelectric actuator can be stabilized by suppressing the device temperature from increasing, the piezoelectric actuator having excellent durability and high reliability can be provided.

Please replace the paragraph beginning at page 12, line 19, with the following rewritten paragraph:

In the multi-layer piezoelectric element of the present invention, it is preferable that 80% by volume or more of crystal grains formed from the metallic component that constitutes the internal electrode have particle size of 1 μm or larger. With such a multi-layer piezoelectric element having the constitution described above, an electrode that is excellent in heat resistance and has low specific resistance of the ~~internal electrode~~ device can be made, thus making it possible to suppress the heat generation from the internal electrode even when operated continuously. Moreover, since the amount of displacement of the piezoelectric actuator can be stabilized by suppressing the device temperature from increasing, the piezoelectric actuator having excellent durability and high reliability can be provided.

Please replace the paragraph beginning at page 31, line 16, with the following rewritten paragraph:

The multi-layer piezoelectric actuator of the first embodiment comprises a stack 10 having rectangular prism shape formed by stacking a plurality of piezoelectric layers 1 and a plurality of internal electrodes 2 alternately and external electrodes 4 formed on the side faces of the stack so as to be connected to the internal electrodes 2 in every other layer, as shown in Fig. 1A and Fig. 1B. Specifically, end of the internal electrode 2 is covered by an insulating material 3 in every other layer on the side face where the external electrode 4 is formed, so that the end face of the internal electrode 2 that is not covered by the insulating material

3 communicates with the external electrode 4. The external electrode 4 is preferably formed from a porous electrically conductive material that has 3-dimensional mesh structure made of an electrically conductive material containing silver as the main component and glass. Portion of the stack 10 identified by reference numeral 9 is an inactive layer wherein the internal electrode 2 is not formed.

Please replace the paragraph beginning at page 37, line 15, with the following rewritten paragraph:

When concentration of the group Ib metal is less than 85% by weight, it leads to a high specific resistance of the internal electrode 2, resulting in heat generation by the internal electrodes 2 when the multi-layer piezoelectric element is operated continuously. In order to prevent the group Ib metal contained in the internal electrode 2 from diffusing into the piezoelectric material 1, concentration of the group Ib metal is preferably in a range from 85% by weight to 99.999% by weight. In order to improve the durability of the multi-layer piezoelectric element, concentration of ~~te~~ the group Ib metal is preferably in a range from 90% by weight to 99.9% by weight. When extra high durability is required, concentration of the group Ib metal is preferably in a range from 90.5% by weight to 99.5% by weight. Moreover, for the maximum durability, concentration of the group Ib metal is preferably in a range from 92% by weight to 98% by weight.

Please replace the paragraph beginning at page 39, line 20, with the following rewritten paragraph:

In the multi-layer piezoelectric element of the first embodiment, the resistance ρ of the device preferably satisfies the relation ρAg < ρ < ρPd, where ρAg is the resistance of the device having the internal electrode [[2]] of which metallic component consists of 100% silver, and ρPd is the resistance of the device having the internal electrode [[2]] of which metallic component consists of 100% palladium.

Please replace the paragraph beginning at page 42, line 3, with the following rewritten paragraph:

It is also preferable that the piezoelectric material 1 of the present invention contains perovskite type oxide consisting of ~~$PbZrO_3$-$PbTiO_3$~~ $PbZrO_3$ - $PbTiO_3$ as the main component. This results in higher piezoelectric strain constant ~~d33~~ d_{33} which enables it to increase the amount of displacement.

Please replace the paragraph beginning at page 44, line 5, with the following rewritten paragraph:

In the multi-layer piezoelectric element of the first embodiment, the internal electrode 2 of which end is exposed on the side face of the stack and the internal electrode 2 of which end is not exposed are stacked alternately, while a groove is formed in the piezoelectric material located between the internal electrode 2 of which end is not exposed and the external electrode 4. The groove is preferably filled with an insulating material having Young's modulus lower than that of the piezoelectric material [[12]] 1. In the multi-layer piezoelectric element having the groove filled with an insulating material having low Young's modulus, stress caused

by the displacement during operation can be mitigated, thus enabling it to suppress heat generation from the internal electrode 2 even when operated continuously.

Please replace the paragraph beginning at page 45, line 6, with the following rewritten paragraph:

The multi-layer piezoelectric element of the present invention is manufactured as described below. In order to make the column-shaped stack 10, first a calcined powder of a piezoelectric ceramic material constituted from perovskite type oxide consisting of ~~$PbZrO_3$-$PbTiO_3$~~ $PbZrO_3$ - $PbTiO_3$, a binder made of an organic polymer such as acrylic resin or butyral resin and a plasticizer such as DOP (dioctyl phthalate) or DBP (dibutyl phthalate) are mixed to form a slurry which is formed into a ceramic green sheet that would become the piezoelectric material 1 by a known method such as doctor blade process or tape molding method such as calender roll process.

Please replace the paragraph beginning at page 51, line 4, with the following rewritten paragraph:

In the multi-layer piezoelectric element having the constitution described above, resistance ρAg of the device having the internal electrode [[2]] of which metallic component consists solely of silver, resistance ρPd of the device of which metallic component consists solely of palladium and the resistance ρ of the device satisfy the relation $\rho Ag < \rho < \rho Pd$, and therefore the amount of displacement does not substantially change even when the actuator is operated continuously over a long period of time under high electric field. Thus the piezoelectric actuator having